PVI SYSTEMS

for NI CompactDAQ

User Manual

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1 Introduction

Chameleon is a general-purpose data acquisition software program for National Instruments' PXI and cDAQ hardware platforms. Chameleon uses LabVIEW libraries to communicate with various hardware modules. A basic system consists of host computer or controller, one or more chassis, and acquisition modules. The system architecture utilizes a host-server design, in which the host provides a user interface for configuring the acquisition and manipulating data. The host controls the server through TCP messaging and the server controls the data acquisition hardware. In a standard Chameleon program, the server is launched by the host, runs in the background, and is not seen by the operator.

1.1 *Software Requirements*

Supported operating systems include Windows Embedded Standard 7 and Windows 7. A PDF reader is required to view Chameleon documentation.

1.2 *Hardware Requirements*

Chameleon supports NI cDAQ-9138 and cDAQ-9139 CompactDAQ stand-alone chassis, NI cDAQ-917x USB chassis and NI cDAQ-918x Ethernet chassis. A list of supported NI C Series modules is provided in Appendix A. If multiple chassis are connected, they must be sequentially named cDAQ1 through cDAQn, with n being the total number of chassis. Chassis can be named using National Instruments Measurement & Automation Explorer (NI MAX).

1.3 *Support*

To obtain support for Chameleon for NI CompactDAQ, please visit the National Instruments website at ni.com/support or the PVI Systems website at pvisys.com.

1.4 *Purchasing*

To purchase Chameleon for NI CompactDAQ, visit the LabVIEW Tools Network.

2 Chameleon Software

2.1 *Chameleon Startup*

Launch Chameleon from the desktop icon, . The Chameleon main panel, shown in Figure 1, will be displayed.

Note that Chameleon will automatically load the last configuration file used by the program. To verify the configuration, or to load a different configuration, select "Configuration" from the Chameleon main panel or from the File->Configuration menu.

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2.2 *Chameleon Panel*

The Chameleon main panel is the primary user interface through which the system functions are accessed.

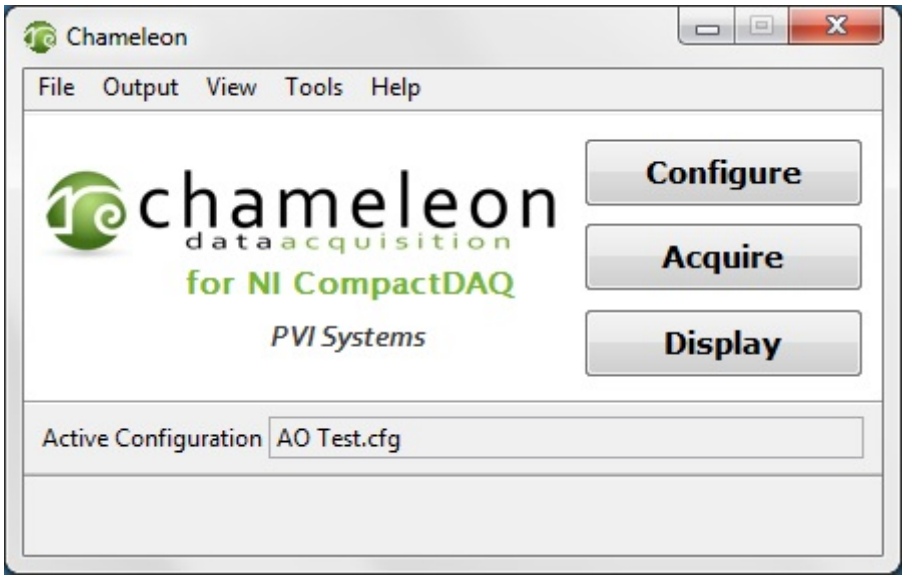

Figure 1: Chameleon Panel

Chameleon menu options include:

File Menu

Configuration Utility: Define system and channel setup parameters.
Data Export: Convert data files to selected formats.

View Menu

TDMS File Viewer: Run the LabVIEW TDMS File Viewer, which displays TDMS file content.

Tools Menu

Scripting: Define and run scripts for automated acquisition.

2.3 *Configuration Utility*

The configuration defines all the channel and acquisition parameters and is controlled through the Configuration Utility panel shown in Figure 2. The configurations can be recalled or saved to a binary file, and can also be read from or saved as a comma delimited text file.

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File Menu
New: Create a blank configuration with a loopback IP address (127.0.0.1) for a single combined host and server on a single chassis.
Open: Load a saved binary configuration file.
Import: Load a comma separated (.csv) text configuration file.
Export: Save the configuration as either a tab delimited (.xls) or comma separated text configuration file.

Tools Menu
Autodetect Hardware: Query the server to identify all installed acquisition hardware and compare the results to supported hardware to create a list of available channels.
Strain Gage Calibration: Perform offset and/or gain calibration on all strain sensors.
Bridge Calibration: Perform offset and/or gain calibration on all bridge sensors.
Preferences: Set user-defined default values for all the available parameters in the configuration utility.

The server IP address must be entered in the System Parameters table before running autodetect.

2.3.1 Input Tab

Group Name: Assign acquisition channels to groups for monitoring and viewing. You must create the group prior to assigning channels. Previously created channels cannot be assigned to a new group. Change the name of the selected group(s) with the arrow button and add groups with the blue plus button.

Channel Name: Change the name of the selected channel(s). If you select multiple channels and make an entry in Channel Name, auto-numbering boxes appear. The base name is appended sequentially.

View Selector: The drop-down menu on the upper right section of the panel displays the selected information in the table and, if a sensor type is selected, displays the sensor-associated input parameters. The choices are All, Physical Layout, Sensor, Voltage, Current, Strain Gage, Thermocouple, RTD, Resistance, Sampling Rate, and Virtual.

Adding Channels: Use the blue plus and X buttons, or right-click in the table to add and remove channels. When adding channels, a subpanel listing available channels by type is displayed.

2.3.1.1 Physical Layout

Ch #: The channel number is automatically assigned by Chameleon based on the installed hardware and is not editable.

Channel Type: The sensor type selected when the channel was added.

Server Number: The server name, as defined in the system parameters, for the server/chassis in which the particular DAQ module resides.

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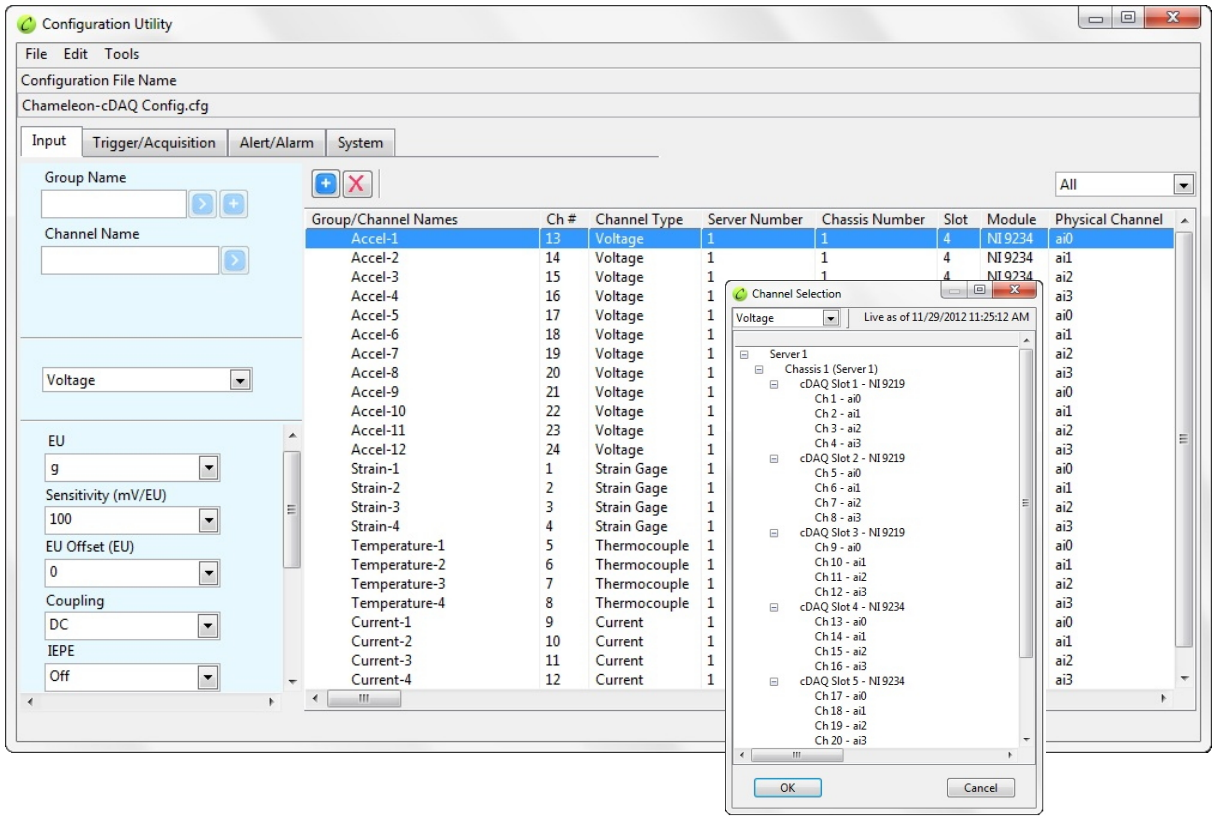

Figure 2: Configuration Utility Main and Channel Selection Panels

Chassis Number: The chassis for all embedded controller systems is "1." Chassis numbers are used only for distinguishing multiple chassis that have been connected to the same controller (as could be done in a MXI system). The chassis number is visible in NI Measurement & Automation Explorer (MAX).

Slot: The chassis slot in which the card is installed.

Module: The module model number

Physical Channel: The base 0 analog input channel on the associated module.

2.3.1.2 Sensor

Location, Sensor Type, Make, Model and Serial Number: These are user labels that define the sensor characteristics but are not required for acquisition and can be left blank.

2.3.1.3 Voltage

ENGINEERING UNITS (EU): Engineering unit label.

Sensitivity mV/EU: Scaling factor for converting voltage to engineering units.

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EU Offset (EU): The DC offset, in engineering units, applied when converting to engineering units.

Coupling: AC/DC coupling selection.

Input Configuration: Options include differential, RSE (referenced single ended), and NRSE (non-referenced single ended).

Range (V): Input voltage range of the selected channel.

External Gain: The linear scalar factor defining any gain applied to the input signal external to the Chameleon system. If no external gain is applied, this should be set to "1".

2.3.1.4 IEPE

ENGINEERING UNITS (EU): Engineering unit label.

Sensitivity mV/EU: Scaling factor for converting voltage to engineering units.

EU Offset (EU): The DC offset, in engineering units, applied when converting to engineering units.

Coupling: AC/DC coupling selection.

IEPE: Set to **ON** to enable IEPE supply current. When IEPE is set to OFF, the input signal is treated as a voltage type input.

IEPE Current (mA): Supply current for IEPE type sensors.

Input Configuration: For IEPE enable modules the input configuration is limited to pseudodifferential.

Range (V): Input voltage range of the selected channel.

External Gain: The linear scalar factor defining any gain applied to the input signal external to the Chameleon system. If no external gain is applied this should be set to "1".

2.3.1.5 Current

Shunt Resistor Location: Specify the location of the shunt resistor. For devices with built-in shunt resistors, specify the location as Internal. For devices that do not have built-in shunt resistors, you must attach an external one, set this input to External, and use the external shunt resistor value input to specify the value of the resistor.

External Shunt Resistor Value: Specify in ohms the resistance of an external shunt resistor.

Maximum Value (A): Specify the maximum range of the sensor in amps.

Minimum Value (A): Specify the minimum range of the sensor in amps.

Engineering Units (EU): Engineering unit label.

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Maximum Value (EU): Specify the engineering units when the sensor is at the maximum value (A).

Minimum Value (EU): Specify the engineering units when the sensor is at the minimum value (A).

2.3.1.6 Strain Gage

Gage Factor: Specify the sensitivity of the strain gages and relate the change in electrical resistance to the change in strain. Each gage in the bridge must have the same gage factor. Refer to the sensor documentation to determine this value.

Poisson Ratio: The ratio of lateral strain to axial strain in the material you are measuring.

Nominal Gage Resistance (Ohm or Ω): The resistance in ohms of the gages in an unstrained position. Each gage in the bridge must have the same nominal gage resistance. The resistance across the arms of the bridge that do not have strain gages must also be the same as the nominal gage resistance. Refer to the sensor documentation to determine this value. The options are 120, 350, 1000, or Custom. If you select Custom, click the Change Cell button to change the selection control to a free-form text control used to enter in the numeric value for the nominal gage resistance.

Strain Configuration: Specify information about the bridge configuration and measurement. Options are Full Bridge I, Full Bridge II, Full Bridge III, Half Bridge I, Half Bridge II, Quarter Bridge I, and Quarter Bridge II.

Initial Bridge Voltage: Specify in volts the output voltage of the bridge in the unloaded condition. This value is subtracted from any measurements before applying scaling equations. This value gets updated from a strain nulling calibration.

Lead Wire Resistance (Ohm or Ω): The amount of resistance in ohms in the lead wires. Ideally, this value is the same for all leads.

Excitation Source: Specify the source of voltage excitation. Options are:

> External – Use an excitation source other than the built-in excitation source of the device. If you select this value, you must use the **Excitation Value** input to specify the amount of voltage excitation.
>
> Internal – Use the built-in excitation source of the device. If you select this value, you must use the **Excitation Value** input to specify the amount of voltage excitation.
>
> None – No excitation is supplied to the channel.

Excitation Value: Specify in volts the amount of excitation supplied to the sensor. Refer to the sensor documentation to determine appropriate excitation values.

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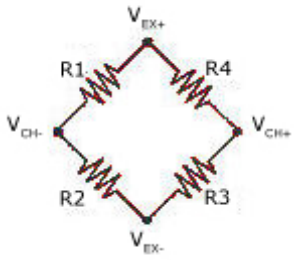
Strain Nulling: Select Yes or No to perform a strain nulling when the Strain Calibration button is pressed on the Configuration Utility Panel. Strain nulling updates the **Initial Bridge Voltage**.

Shunt Calibration: Select Yes or No to perform a shunt calibration when the Strain Calibration button is pressed on the Configuration Utility Panel. Shunt calibration updates the **Gain Adjustment**.

Shunt Resistance (kΩ): Specify the shunt resistance in kΩ. This is used for the shunt calibration. Options are 33.333, 50, and 100.

Shunt Element Location: Specify the location of the shunt resistor. This is used for the shunt calibration. Options are:



R1 – Between V_{ch-} and V_{ex+}

R2 – Between V_{ch-} and V_{ex-}

R3 – Between V_{ch+} and V_{ex-}

R4 – Between V_{ch+} and V_{ex+}

None

Gain Adjustment: Specify the result of a shunt calibration. This multiplies data read from the channel by this value. This value should be close to 1.0.

Min Value (V): Minimum input voltage range of the selected channel.

Max Value (V): Maximum input voltage range of the selected channel.

2.3.1.7 Thermocouple

Thermocouple Type: Specify the type of thermocouple connected to the channel. Thermocouple types differ in composition and measurement range. The available thermocouple types are:

J, K, N, R, S, T, B, E

Open Detect: Specify whether to apply the open thermocouple detection bias voltage to the channel.

Auto Zero Mode: Specify how often to measure ground. NI-DAQmx subtracts the measured ground voltage from every sample. The available options are:

Every Sample – Perform an auto zero at every sample of the acquisition.

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None – Do not perform an auto zero.

Once – Perform an auto zero at the beginning of the acquisition.

Engineering Units (EU): Specify the units to use to return temperature measurements. The available temperature units are:

Celsius, Fahrenheit, Kelvin, Rankine

Min Value (Units): Minimum input range of the selected channel in the units specified.

Max Value (Units): Maximum input range of the selected channel in the units specified.

2.3.1.8 RTD

RTD Type: Carbon resistor, strain free, thin film, wire wound, and coiled elements.

A/B/C Coefficient: The coefficients for the Callendar-Van Dusen equation.

r0 (Ohm): The resistance of the sensor at 0 degrees Celsius.

Resistance Configuration: Specify the number of wires to use for resistive measurements from 2-wire, 3-wire, and 4-wire modes.

Excitation Source: Specify the source of current excitation. Options are:

External – Use an excitation source other than the built-in excitation source of the device. If you select this value, you must use the **Excitation Value** input to specify the amount of current excitation.

Internal – Use the built-in excitation source of the device. If you select this value, you must use the **Excitation Value** input to specify the amount of current excitation.

None – No excitation is supplied to the channel.

Excitation Value (A): Specify in amperes the amount of excitation to supply to the sensor. Refer to the sensor documentation to determine this value.

Engineering Units (EU): Specify the units to use to return temperature measurements. The available temperature units are:

Celsius, Fahrenheit, Kelvin, Rankine

Min Value (Ohm): Minimum input range of the selected channel in the units specified.

Max Value (Ohm): Maximum input range of the selected channel in the units specified.

2.3.1.9 Resistance

Resistance Configuration: Specify the number of wires to use for resistive measurements from 2-wire, 3-wire, and 4-wire modes.

Excitation Source:

External – Excitation source other than the built-in excitation source of the device.

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Internal – Use the built-in excitation source of the device.

None – No excitation is supplied to the channel.

Excitation Value (A): Specify in amperes the amount of excitation to supply to the sensor. Refer to the sensor documentation to determine this value.

Min Value (Ohm): Minimum input range of the selected channel in the units specified.

Max Value (Ohm): Maximum input range of the selected channel in the units specified.

2.3.1.10 Sampling Rate

Sampling Rate (Hz): Sampling rate of each input channel. For a given module, the sampling rate must be the same for each channel. If the sampling rate is modified for any channels on a selected module, Chameleon automatically changes the sample rate for all the channels on that module.

Sampling rate on all input and output channels on a single card must be the same.

2.3.1.11 Virtual

Create a virtual channel by selecting Virtual from the drop-down menu and then selecting the plus button under the Input tab. A virtual channel is the mathematical combination of any number of input channels. After adding a virtual channel, select Edit Equation to define the equation for combining input channels. This equation can be modified during acquisition. The virtual channel equation is stored in the data file, though the resultant is not stored.

2.3.2 Trigger/Acquisition Tab

Trigger Type: The trigger type can be set to either free running, digital, digital pre-trigger, analog, or analog pre-trigger. In free running mode, the acquisition begins once the start button is pressed. In digital trigger and digital pre-trigger modes, the acquisition does not start until the master timing card receives a 5 V TTL pulse on the trigger port.

Re-Trigger: If enabled, only a finite, triggered acquisition is available. When the triggered acquisition is complete, the system waits the **Hold-off Time** and then re-arms the trigger for another acquisition. The system creates a new TDMS file and auto-names the file with an incrementing numerical value or a timestamp, depending on the auto increment selection in the Time Acquisition panel.

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Separate Log Rate: If enabled, the system decimates data being acquired to the specified **Initial Log Rate** prior to writing to disk. This can also be modified from the Signal Monitor and Time Acquisition panels. All channels are written at this rate. The rate can be set from less than once per second to up to, but not more than, the sampling rate.

Analog and digital triggering is supported only for the NI 9205 and NI 9206 modules, and the trigger module must be in slot 1. The analog trigger channel must be the first channel of the trigger module. The digital trigger line must be connected to PFI0 of the trigger module.

2.3.3 Alert/Alarm Tab

You can display alerts and alarms from the Signal Monitor panel. They function the same way and are for the user to distinguish between alarms of higher precedence and alerts of lower precedence.

Alert/Alarm Name: You can change the selected alert/alarm name with the arrow button and add a new alert/alarm with the plus button.

Adding Channels: Add channel(s) to a selected alert/alarm by selecting the type of channel from the drop-down menu, selecting the desired channel(s) in the table, and clicking the plus button. Change the name of the added channel(s) by clicking the arrow button next to the Add Channel Window.

Condition Name: Change the name of the condition/channel selected in an alert/alarm.

Condition: Specify the condition for the channel in the alert/alarm from >, <, <=, and !=.

Threshold Value (EU): The value at which the alert/alarm is tripped given the condition.

Level Type: Specify threshold level type from RMS, peak, and mean.

Audio Alarm: Turn the audio alarm on or off with Yes or No.

Audio File Path: Specify the location of the audio file for the audio alarm.

Relay Channels: Specify a relay channel for the selected alert/alarm. Click the arrow button next to the Relay Channels window to add/change a relay channel. When the alert/alarm is tripped, the Relay Channel is activated.

2.3.4 System Tab

You can add more servers to the configuration by selecting the blue plus button or right-clicking within the table. The red X button deletes the selected server. Use the up and down arrow buttons to move the position of the selected server in the system configuration panel.

Controller IP Address: This is the static IP address of each of the servers. The addresses are used to establish TCP communications between the host and server(s).

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If a single computer is being used as both the host and server, set the IP address to 127.0.0.1 (local host loopback).

Controller Number: This is a label used to uniquely identify each server.

Timing Type: The timing type can be set to either master or slave. If a server is set as a master, it uses its own clock source as defined in the “Clock Source” column and output clock and trigger signals through the installed timing module. If a server is set as a slave, it gets the clock source from the installed timing module.

Location: The label for identifying the location of each server; it is not required and can be left blank.

Clock Source: The clock source can be set as either internal or GPS, and is only applicable to master timing type servers. The timing type for slave chassis should match that of the master. Note that GPS is not available on all timing modules.

2.4 Data Export

The Data Export utility converts acquired TDMS time or frequency files to CSV or DIAdem formatted files. Exporting to DIAdem converts the unscaled binary data from voltage and IEPE sensor types to data scaled in engineering units. This allows the data to be imported directly to DIAdem. If the TDMS source is a folder, all TDMS files in that folder are converted. If a single file is selected, only that file is converted. The configuration information is written to a text file and the data is written to the selected format.

2.5 Acquire Panel

The Acquisition Panel includes, “Time Acquisition”, “Frequency Acquisition”, and “Signal Monitoring” utilities. The Acquisition panel also includes menus to; update the log rate or virtual channel equation on-the-fly, update the range setting for any voltage channel, create time, frequency, or numeric displays of any channel, view alert and alarm status, or monitor overload and open/short conditions for DSA channels.

2.5.1 Time Acquisition

The time acquisition control tab, shown in Figure 3, provides an interface for the streaming of time data to disk. Two possible acquisition modes are continuous, which streams time data to disk until the stop button is pressed, and finite, which streams data to disk for a specified period of time. The panel includes indicators that show running acquisition time. File save options include explicit, append auto increment number, and append auto increment timestamp. The append options prompt for a base file path and base file name. The Comments tab allows the user to enter comments about the test and view them later in the TDMS File Viewer.

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2.5.2 Frequency Acquisition

The frequency acquisition utility streams time data to a selected file and immediately reads the time data and performs frequency processing base on user defined settings. Acquisition type options include transfer function, power spectrum, and Power Spectral Density (PSD). Processed data can be saved to a file and later reloaded.

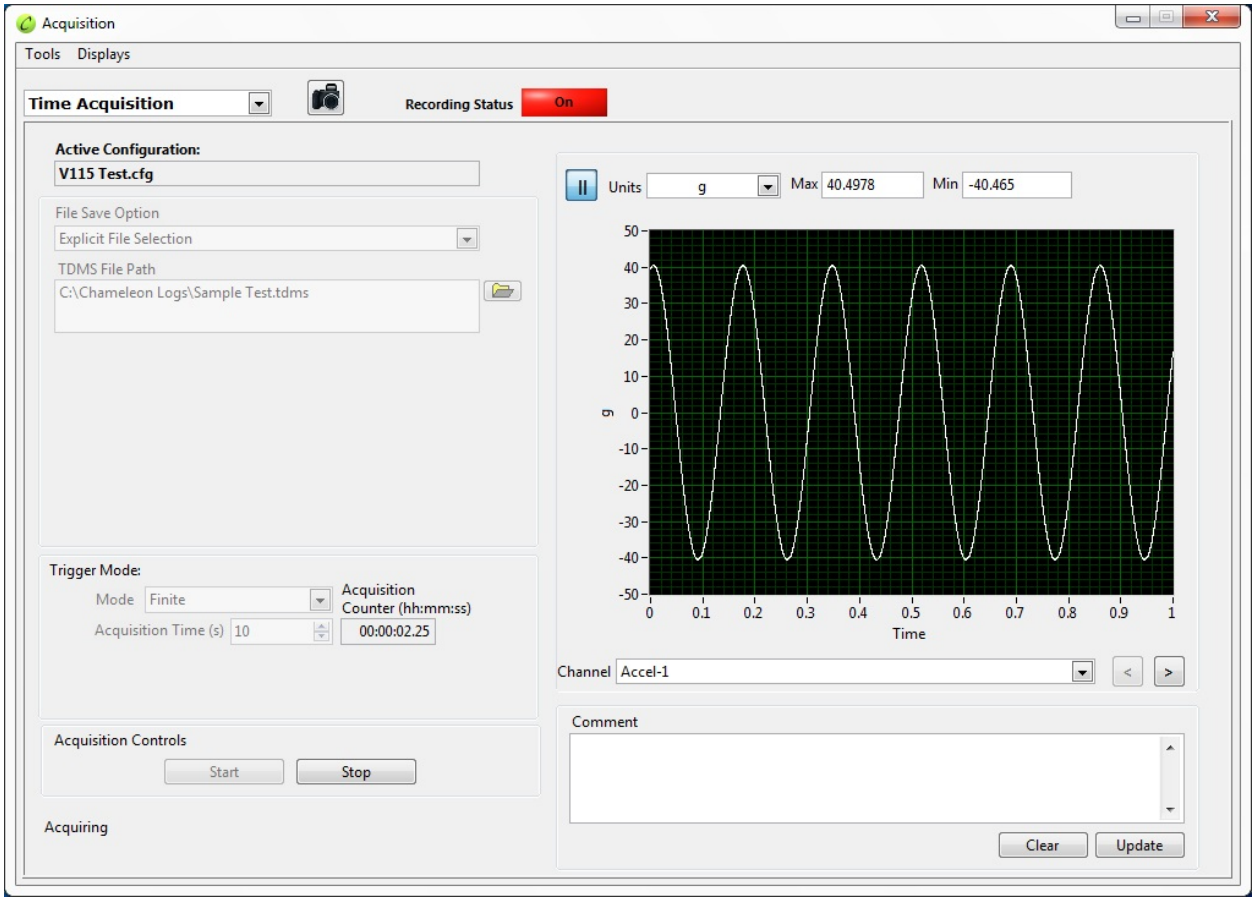

Figure 3: Time Acquisition Window

2.5.3 Signal Monitor

Signal monitoring provides a compact display of all signal levels and DSA channel error conditions. The Signal Monitor panel, shown in Figure 4, includes bar graphs that show the instantaneous RMS or peak levels for each channel, and the existence of an overload or short (if supported by the hardware).

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Tools Menu

Log Rate: Update the rate at which data is written to disk. All channels are written at this rate. The rate can be set from less than once per second to up to, but not more than, the sampling rate.
Edit Virtual Channels: Update the virtual channel equations.
Group Info: Table of group minimum, maximum, and RMS values.
Update Channel Range: Modify the input range of voltage channels.

Displays Menu

Frequency: Frequency display of the peak or RMS value of the selected channel.
Time: Time display of the peak or RMS value of the selected channel. The time window can display multiple channels, is resizable, and has an editable x-axis sacle.
Numeric: Numeric display of the peak or RMS value of the selected channel.
Alerts/Alarms: Display the alert/alarm status panel.

The camera icon in any window allows the user to capture and save a screenshot of that window.

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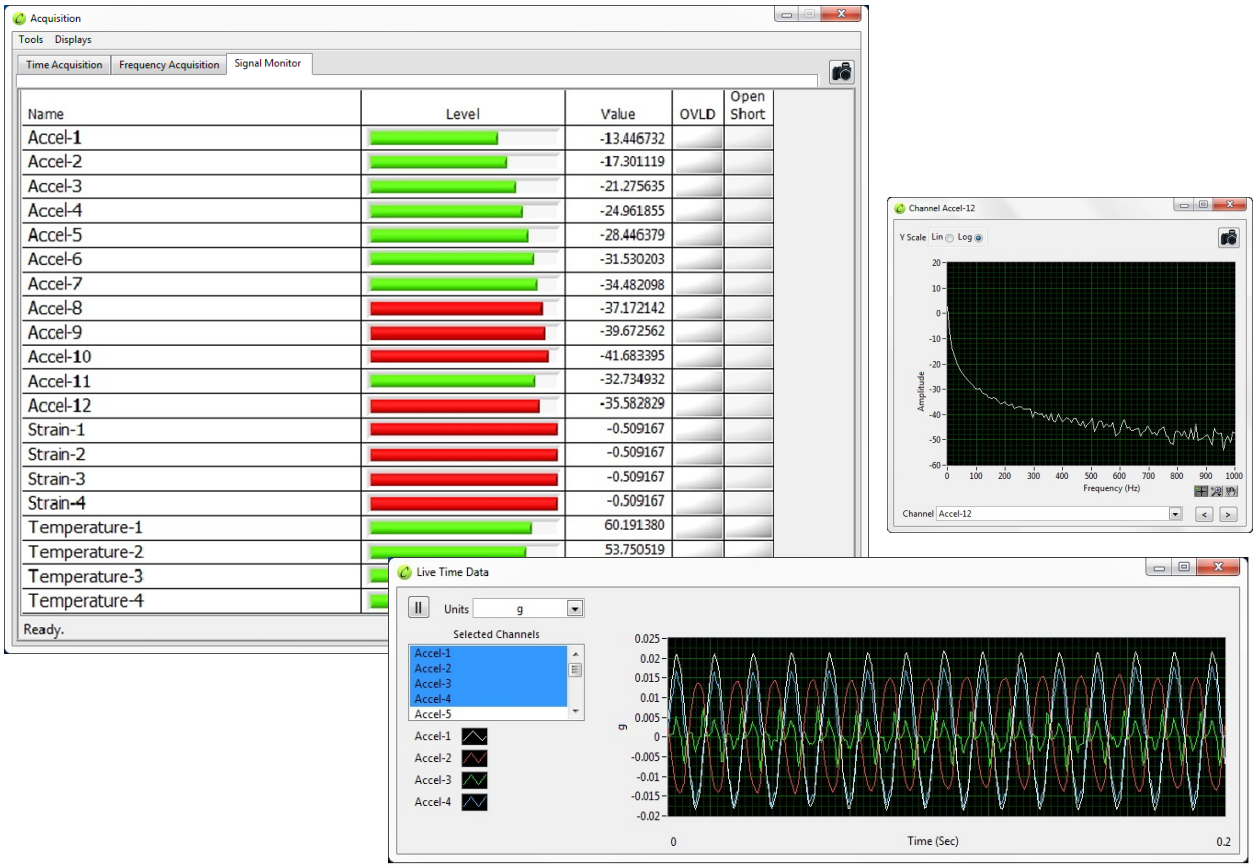

Figure 4: Signal Monitor Panel with Time and Frequency Displays

File Format

The TDMS data file includes all of the configuration information, acquisition errors, and acquired data. Voltage data is saved in an unscaled binary format and all other data is saved in a waveform format.

When acquiring long acquisitions such as machine or structural monitoring, the best practice is to either set all the channels on the chassis to sample at the same rate or use the re-triggered acquisition mode to acquire multiple data files. Re-triggering is described in the configuration trigger parameters.

When using a 9469 module for chassis synchronization, connections between chassis must be established using NI Measurement & Automation Explorer (MAX) prior to opening Chameleon.

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2.6 Display and Processing Panel

2.6.1 Single Trace Graph

The Single Trace Graph utility, shown in Figure 8, displays the complete acquired time trace and the selected segment of that trace for a single selected channel. The full trace is automatically decimated if the total number of samples is large. You can filter the zoomed data using the filter settings on the Display and Filter Setting tab.

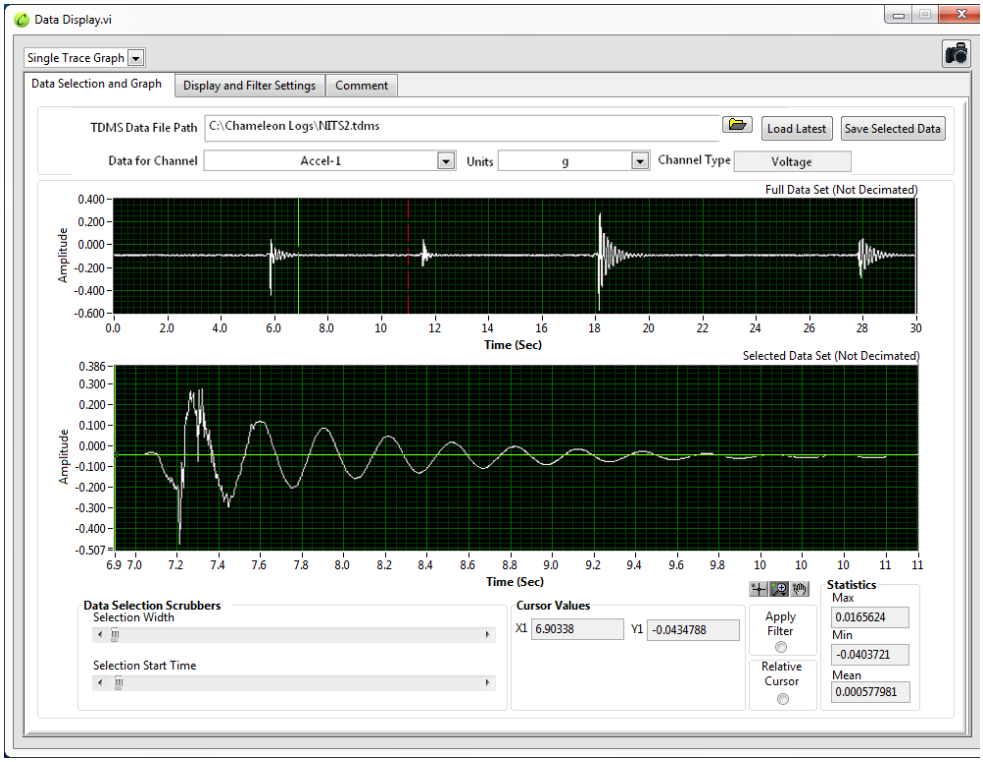

Figure 5: Single Trace Graph Panel

2.6.2 Multiple Trace Graph

The Multiple Trace Graphs panel, shown in Figure 6, displays recorded data to one or more graphs with each graph having one or more traces. Data can be displayed from a previously recorded file or from a file that is currently being acquired.

When the Create New Graph button is selected, the panel in Figure 7 is displayed. The available data channels are displayed in the list on the left side of the Graph Channels tab. Select the channels to be displayed and use the blue + button to add them to the display channel list on the right side of the panel. Use the blue > button to update selected display channels. Select OK to display the data.

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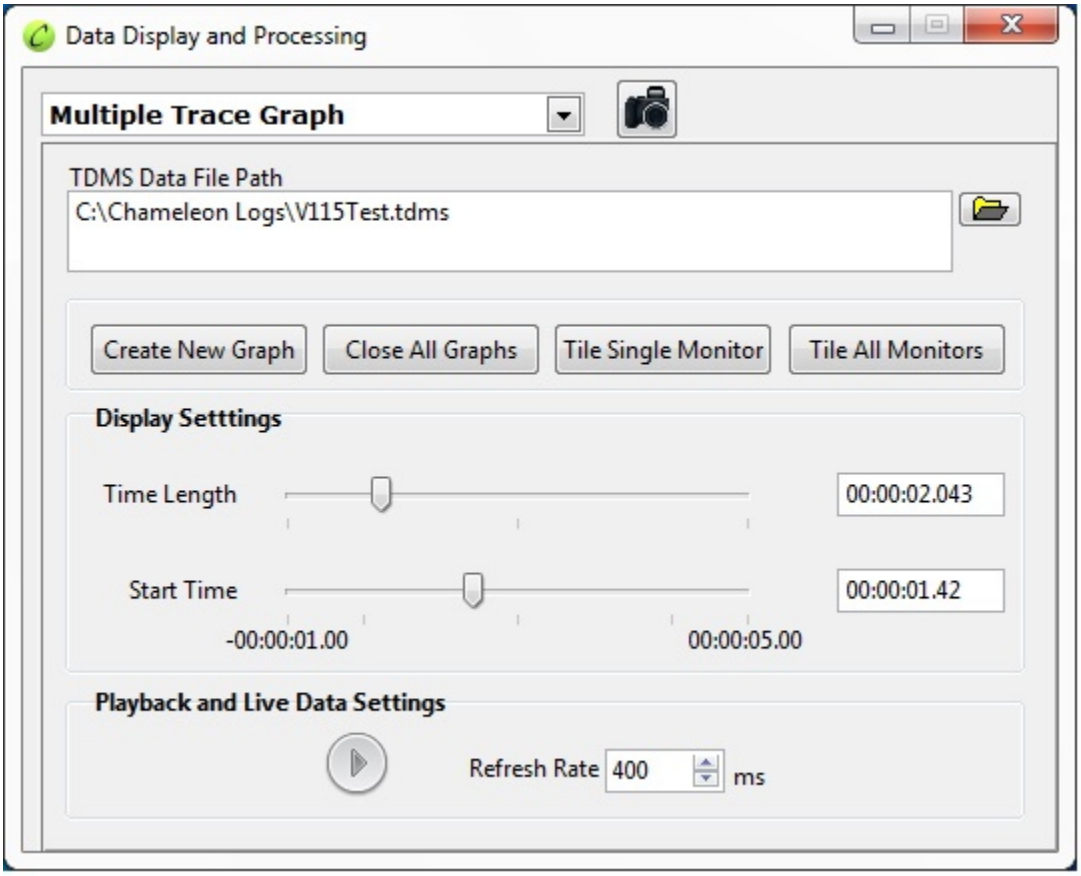

Figure 6: Multiple Trace Graphs Control Panel

Graph attributes such as axis labeling and formatting and legends are configured in the Graph Properties tab. Each graph can have up to four separate Y-axes with each axis having a different scale and label. You can edit and add Y-axis labels by right-clicking in the Y-Axis Labels box. You can add attributes such as cursor and plot legends by right-clicking within the Example Graph and selecting visible items. You can save and load properties for each graph through the file menu.

Once you have created a graph, you can modify selected channels and properties by right-clicking within the graph and selecting Edit Graph Properties to return to the graph editor. Return to the Multiple Trace Graph panel to create additional graphs.

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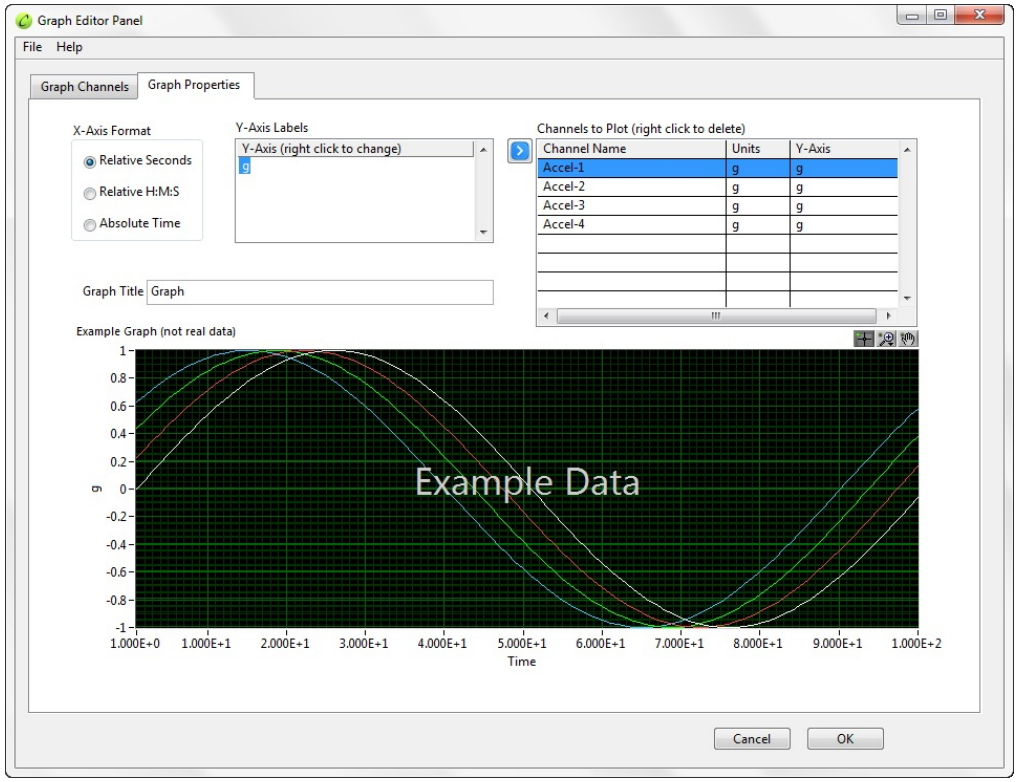

Figure 7: Multiple Trace Graph Editor Panel

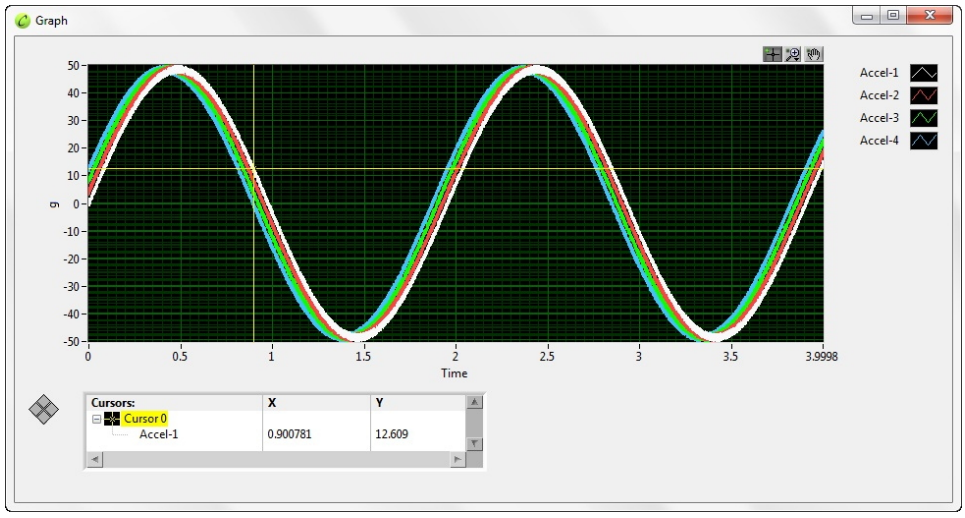

Figure 8: Multiple Trace Data Graph

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2.6.3 Frequency Processing and Display

The frequency processing utility is used to frequency process time data from a selected data file. Processing type options include transfer function, power spectrum, and Power Spectral Density (PSD). Processed data can be saved to a file and later reloaded.

2.7 Scripting

The scripting utility helps you automatically perform predefined steps including loading configuration files and acquiring data. You can configure the utility to automatically run a selected script on startup. This feature helps you automatically acquire data on system power-up.

Available Actions: Select scripting action from Load Configuration, Wait, and Time Acquisition.

Load Configuration: When the script is run, it loads the configuration that is selected. Clicking on Load Configuration in the script opens the Load Configuration Parameters dialog window. Click the browse button (folder icon) to select a saved configuration. Press OK to confirm the configuration to load, and press Cancel to close the dialog without selecting a configuration.

Wait: When the script is run it waits the specified amount of time in seconds. Clicking on Wait in the script opens the Wait Parameters dialog window. Select the Time Mode from relative and absolute. When you select relative, specify the time to wait in hours, minutes, and seconds and specify the Wait Type from after start of script, since start of last step, and since end of last step. Click OK to confirm wait time and cancel to close the dialog without selecting a wait time.

Time Acquisition: When the script is run, it runs the specified time acquisition. Clicking on Time Acquisition in the script opens the Time Acquisition Parameters. Clicking the checkbox labeled Override Previous File enables the selection of a File Save Option, TDMS Base Folder Path, Base File Name, Zero Padding, and Next #. Specify the Mode from finite and continuous and the Acquisition Time in hours, minutes, and seconds. Click OK to confirm the parameters and Cancel to close the dialog without specifying Time Acquisition parameters.

Edit Step: Open the parameters for the selected step in the script.
Delete Step: Remove a step from the script.
Execute: Start the script.
Abort: Stop the script while it is running.
Undo: Cancel the effects of the previous action.
Redo: Redo the undone action.
New: Clear the script.
Load: Load a saved script
Save: Save a script.

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Save As: Save current script with a new name/location.
Close: Close the Script Editor.

Run on Application Startup: When this option is enabled, the previously saved script in the Script file path is automatically executed when Chameleon starts. The panel in Figure 9 is displayed at Chameleon startup. This provides the option to run Chameleon automatically on system power-up. If you place Chameleon in the Windows startup folder and you enable Run on Application Startup, you can configure Chameleon through the script to automatically begin taking data at system power-up.

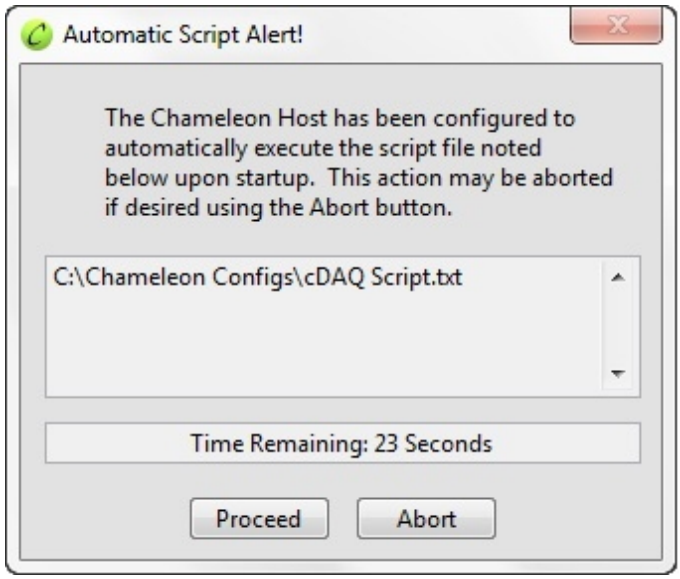
Automatic Script Alert!
The Chameleon Host has been configured to automatically execute the script file noted below upon startup. This action may be aborted if desired using the Abort button.
C:\Chameleon Configs\cDAQ Script.txt
Time Remaining: 23 Seconds
Proceed
Abort

Figure 9: Automatic Scripting Alert Panel

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Appendix A: Supported NI C Series Modules

Model Number	Signal/Sensor Input Type
NI 9201	8-Channel, ±10 V, 500 kS/s, 12-Bit Analog Input Module
NI 9203	8-Channel, ±20 mA, 200 kS/s, 16-Bit Analog Current Input Module
NI 9205	32-Channel, ±200 mV to ±10 V, 16-Bit, 250 kS/s Analog Input Module
NI 9206	16-Channel, ±200 mV to ±10 V, 16-bit, Analog Input for Fuel Cells
NI 9211	4-Channel, 14 S/s, 24-Bit, ±80 mV Thermocouple Input Module
NI 9213	16-Channel Thermocouple Input Module
NI 9214	16-Channel Isothermal Thermocouple Input Module
NI 9215	4-Channel, 100 kS/s/ch, 16-bit, ±10 V Analog Input Module
NI 9217	4-Channel, 100 Ω RTD, 24-Bit Analog Input Module
NI 9219	4-Channel, 24-Bit Universal Analog Input
NI 9221	8-Channel, ±60 V, 800 kS/s, 12-Bit Analog Input Module
NI 9225	3-Channel, 300 Vrms Analog Input Module
NI 9229	4-Channel, ±60 V, 24-Bit, Ch-Ch Isolated Analog Input Module
NI 9232	3 Channel, ±30 V, 102.4 kS/s per Channel, 24-Bit IEPE
NI 9234	4-Channel, ±5 V, 51.2 kS/s per Channel, 24-Bit IEPE
NI 9237	4-Channel, ±25 mV/V, 24-Bit Simultaneous Bridge Module
NI 9239	4-Channel, ±10 V, 24-Bit, Ch-Ch Isolated Analog Input Module
NI 9235	8-Channel, 120 Ω Quarter-Bridge Strain Gage Module
NI 9236	8-Channel, 350 Ω Quarter-Bridge Strain Gage Module
NI 9469	Chassis Synchronization. Connections between chassis must be established using NI Measurement & Automation Explorer (MAX) prior to opening Chameleon.

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Appendix B: Configuring TCP Ports

You can configure the TCP communications ports by editing

C:\ProgramData\PVI Systems\Chameleon-cDAQ\ChameleonTCP.txt

The following default settings are configured during installation:

[ChameleonTCP]
Command_Port = 50001
AI_Ack_Port = 50002
AO_Ack_Port = 50003
Error_Port = 50004
Channel_Status_Port = 50005
Monitor_Time_Port = 50006
Monitor_Freq_Port = 50007
Acq_ET_Port = 50009

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